



DAILY NEWS BULLETIN

LEADING HEALTH, POPULATION AND FAMILY WELFARE STORIES OF THE DAY
Wednesday 20210818

कोरोना

आज फिर बढ़े कोरोना संक्रमण के मामले, 24 घंटों में मिले 35178 नए संक्रमित और 440 मौतें हुईं दर्ज (Dainik Jagran: 20210818)

https://www.jagran.com/news/national-india-reports-35178-new-covid19-cases-and-440-deaths-in-the-last-24-hrs-as-per-health-ministry-common-man-issues-21937590.html?itm_source=website&itm_medium=homepage&itm_campaign=p1_component

केंद्रीय स्वास्थ्य मंत्रालय द्वारा आज जारी किए गए आंकड़ों के अनुसार देश भर में बीते 24 घंटों में 35178 नए कोरोना संक्रमितों की पहचान की गई और 440 लोगों की मौत हो गई। वहीं इस अवधि में संक्रमण से 37169 लोग ठीक हुए।

नई दिल्ली, एएनआइ। भारत में पिछले 24 घंटों में कोरोना वायरस के 35,178 नए मामले सामने आए और 440 संक्रमितों की मौत हो गई। वहीं देश में सक्रिय मामलों में कमी दर्ज की गई है जो पिछले 148 दिनों में सबसे कम है। इन 24 घंटों में कोरोना संक्रमण से ठीक होने वालों की संख्या 37,169 है। यह जानकारी केंद्रीय स्वास्थ्य मंत्रालय ने बुधवार सुबह जारी किया। मंत्रालय के अनुसार फिलहाल देश में साप्ताहिक पॉजिटिविटी रेट 1.95 फीसद है। बता दें कि 54 दिनों से यह दर 3 फीसद से कम बना हुआ है। वहीं हर दिन दर्ज होने वाला संक्रमण दर 1.96 फीसद है। यह दर पिछले 23 दिनों से 3 फीसद से कम है।

148 दिनों में सबसे निचले पायदान पर सक्रिय मामले

मंत्रालय ने बताया कि पिछले 148 दिनों में सबसे कम सक्रिय मामले 3,67,415 दर्ज किए गए हैं जो कुल मामलों का 1.14 फीसद है और यह मार्च 2020 के बाद सबसे कम है। मंत्रालय के अनुसार इस घातक महामारी से बचाव के लिए देश में जारी कोरोना वैक्सीनेशन अभियान के तहत 16 जनवरी से अब तक कुल वैक्सीनेशन का आंकड़ा 56,06,52,030 हो गया है। इसमें से 55,05,075 डोज 24 घंटों में लगाई गई है। भारतीय चिकित्सा अनुसंधान परिषद (ICMR) के अनुसार अब तक कुल 49,84,27,083 सैंपल टेस्ट किए जा चुके हैं जिसमें से 17,97,559 सैंपल की कोरोना टेस्टिंग केवल मंगलवार को किए गए।

देश में कुल संक्रमितों का आंकड़ा-

महामारी कोविड-19 की शुरुआत से लेकर अब तक देश भर में कुल पॉजिटिव केस का आंकड़ा 3,22,85,857 हो गया है। वहीं अभी देश में सक्रिय मामलों का आंकड़ा 3,67,415 और संक्रमण से ठीक हो चुके लोगों की संख्या 3,14,85,923 है। महामारी के कारण मरने वालों का कुल आंकड़ा 4,32,519 हो चुका है।

Corona Vaccine

Daily shots hit record as case slide continues (Hindustan Times: 20210818)

<https://epaper.hindustantimes.com/Home/ArticleView>

New Delhi : With over 8.8 million doses of Covid-19 vaccines administered on Monday, India set a new record for the highest ever number of single-day vaccinations since the start of the drive on January 16, the Union health ministry said, even as national daily infections have again started dropping with the outbreak beginning to contract in the state of Kerala, the most recent infection hotspot.

The central government attributed the increase in the pace of daily vaccination to the availability of shots, “advance visibility of supply” to states and Union territories which enabled them to plan better, as well as the “streamlining” of the overall supply chain.

According to government data, 560 million doses have been administered to 435 million people across India till Tuesday evening. This translates to over 46% of all adults in the

country having been administered at least one dose of the vaccine – 33% of India’s adults have been partially vaccinated, while another 13.3% have received both shots of the vaccine, data shows.

On Monday, 8.8 million doses were administered across the country – the highest ever, according to government data. To be sure, this occurred a day after daily vaccinations dropped to just 2 million on Sunday. The drop on Sunday, however, was expected as vaccination numbers generally drop over weekends and holidays (Sunday was also Independence Day).

“88 lakh India achieves the highest single-day record in #COVID19 vaccine doses. Yesterday will go down in the history of the world’s #LargestVaccineDrive. Congratulations [India],” tweeted Union health minister Mansukh Mandaviya.

The previous record for single-day doses was set on June 21 when around 8.6 million jabs were administered after the new phase of universalisation of Covid-19 vaccination commenced.

To be sure, the seven-day average of daily dose administration still remains patchy. The current rate, despite Monday’s record numbers, remains much below peak capacity exhibited in the past – 5.7 million daily doses have been administered on average in the last seven days against a peak of 6.3 million daily doses for the week ended June 26, data shows. However, that this number is rising again is a good sign.

Health ministry officials said they expect a further increase in inoculation rates in the coming weeks.

“With vaccine supplies and logistical arrangements gradually improving, the daily numbers are going to go further up. It was expected. We have the capacity and capability to do more in a single day and it will see further increase in coming weeks,” a government official aware of the matter said on condition of anonymity.

This rise in vaccinations is particularly significant as it comes at a time when cases have again started dropping. The seven-day average of new infections, which denotes a region’s Covid-19 case curve, has now dropped to 36,126 cases a day for the week ending August 16 – the lowest this has touched in the country since March 20, or in 149 days. At its peak during India’s brutal second wave, this number soared to 391,819 cases a day for the week ending May 9, according to HT’s dashboard.

For two-and-a-half months after the May 9 peak, India’s Covid curve was witnessing a near-steady drop which was briefly halted in the last week of July by an abrupt rise of infections in Kerala. For the week ended July 25, average daily cases in India dropped to 38,007, but this number started rising and touched 40,817 for the week ended August 1 – a rise that was pushed almost entirely by numbers from Kerala, which still accounts for more than half of all new infections in the country.

These findings were echoed in the epidemiological estimates conducted by epiforecasts.io, a website that assesses temporal variations in transmission in different countries, that showed that India's overall effective reproduction number (Rt) has dropped to 0.92. An Rt of more than 1 means an outbreak is expanding in a region, while that below 1 denotes a contraction. Kerala had an Rt of 0.95.

Government experts said an increase in vaccination rate may improve the chances of the country being able to avert a potential third Covid wave.

“It depends on how many of our people are protected, and how many have been exposed to the virus. The vaccination drive is successfully progressing and we are hopeful that will soon be able to immunise a majority of our population that will be a big factor in determining that we don't see a third wave. Also, even if we see a third wave, it is a small one,” Dr Himanshu Chauhan, joint director, National Centre for Disease Control (NCDC), said in a video statement.

Independent experts, however, stressed that vaccination may not immediately help in pandemic control but would prove beneficial in the long run.

“Our expectations of pandemic control require revision and I don't think we have done the distinction between healthcare expectation and public health expectation. The healthcare piece will be affected more by vaccination than pandemic control as defined by how we currently use indicators,” said Dr Gagandeep Kang, one of country's top vaccinologist from Christian Medical College, Vellore.

US may recommend Covid vaccine boosters at 8 mths (Hindustan Times: 20210818)

<https://epaper.hindustantimes.com/Home/ArticleView>

A health care worker administers a Pfizer-BioNTech Covid-19 booster vaccine in Montevideo, Uruguay, on Monday. BLOOMBERG

Washington : US health experts are expected to recommend Covid-19 vaccine boosters for all Americans, regardless of age, eight months after they received their second dose of the shot, to ensure lasting protection against the coronavirus as the Delta variant spreads across the country.

Federal health officials have been actively looking at whether extra shots for the vaccinated would be needed as early as this fall, reviewing case numbers in the US as well as the

situation in other countries such as Israel, where preliminary studies suggest the vaccine's protection against serious illness dropped among those vaccinated in January.

An announcement on the US booster recommendation was expected as soon as this week, according to two people familiar with the matter who spoke to The Associated Press on the condition of anonymity to discuss internal deliberations.

Doses would only begin to be administered widely once the Food and Drug Administration formally approves the vaccines. That action is expected for the Pfizer shot in the coming weeks.

Last week, US health officials recommended boosters for some with weakened immune systems, citing their higher risk of catching the virus and evidence that the vaccines' effectiveness waned over time.

The director of the National Institutes of Health, Dr Francis Collins, said Sunday that the US could decide in the next couple weeks whether to offer coronavirus booster shots to Americans this fall. Among the first to receive them could be health care workers, nursing home residents and other older Americans, who were some of the first Americans to be vaccinated once the shots received emergency use authorisation last December.

Since then, more than 198 million Americans have received at least one dose of a Covid-19 vaccine, according to the Centers for Disease Control and Prevention, with more than 168 million fully vaccinated. Still, the country is experiencing a fourth surge of virus cases due to the more transmissible Delta variant, which is spreading aggressively through unvaccinated communities but is also responsible for an increasing number of so-called "breakthrough infections" of fully vaccinated people.

Israel, which exclusively administered the Pfizer shot, has been offering a coronavirus booster to people over 60 who were already vaccinated more than five months ago in an effort to control its own surge in cases from the Delta variant.

For months, officials had said data still indicated that people remain highly protected from Covid-19, including the Delta variant, after receiving the two-dose Pfizer or Moderna regimen or the one-shot Johnson & Johnson vaccine. But US health officials made clear Sunday they are preparing for the possibility that the time for boosters may come sooner than later.

Officials were continuing to collect information as well about the J&J vaccine, which was only approved in the US in late February, to determine when to recommend boosters, one of the officials said.

Global health officials, including the World Health Organization, have called on wealthier countries to hold off on booster shots to ensure the supply of first doses for people in the developing world.

Pregnancy

Mothers with diabetes during pregnancy have increased risk of eye problems: Study (Hindustan Times: 20210818)

<https://www.hindustantimes.com/lifestyle/health/mothers-with-diabetes-during-pregnancy-have-increased-risk-of-eye-problems-101629257978526.html>

The research analysed the associations between maternal diabetes before or during pregnancy and the risk of high refractive error (RE): conditions in which there is a failure of the eye to properly focus images on the retina.

A new study lead by a team of international researchers finds that mothers who have diabetes before or during their pregnancy are more likely to have children who go on to develop eye problems.

The findings of the study were published in Diabetologia (the journal of the European Association for the Study of Diabetes [EASD])

The research is by Dr. Jiangbo Du, State Key Laboratory of Reproductive Medicine, Nanjing Medical University, Nanjing, China, and Dr. Jiong Li, Aarhus University, Aarhus, Denmark, and colleagues. It analysed the associations between maternal diabetes before or during pregnancy and the risk of high refractive error (RE): conditions in which there is a failure of the eye to properly focus images on the retina.

RE is one of the most common forms of visual impairment and includes both long and short-sightedness as well as astigmatism.

Collectively these conditions are the second most common form of disability globally, and while low-degree REs can be corrected optically using spectacles or contact lenses, more serious high-degree REs can develop into severe and irreversible visual impairment that can reduce an individual's quality of life.

Patients with long Covid-19 syndrome continue to have higher measures of blood clotting, which may explain their persistent symptoms such as reduced physical fitness and fatigue, according to a study.

Blood clotting may be root cause of long Covid-19 syndrome: Study

In recent decades there has been a rapid increase in the prevalence of RE, indicating that non-genetic factors may play an important role in its development. An increased tendency to perform close-up work such as using computers for long periods, as well as a lack of outdoor activity, has been established as the main acquired risk factors for low and moderate RE

development in school-age children and young adults. The causes of high RE defects, however, are still not fully understood.

Earlier research has shown that individuals with severe RE may have congenital eye defects before birth, suggesting that the conditions to which the fetus is exposed in the uterus may play a role in the development of more serious RE in later life. Maternal hyperglycemia (high blood sugar) during pregnancy may lead to elevated fetal blood glucose levels, which can damage the retina and optic nerve and may lead to changes in the shape of the eyes that ultimately cause RE.

The authors believed that exposure to the effects of maternal diabetes while in the uterus could negatively affect the development of the fetus and lead to high RE in later life. They also anticipated that the most pronounced associations would be observed among mothers with diabetic complications since they usually represent more severe cases of the disease.

The team conducted a population-based cohort study using several Danish national medical registers and incorporated the details of all live births in Denmark from 1977 to 2016. Follow-up began at birth and continued until the first high RE diagnosis (where applicable), the death of the subject, their emigration, their 25th birthday, or the end of the study period on 31 December 2016, whichever came first.

Mothers were considered to have diabetes if they were diagnosed with the disease either before or during pregnancy, and those with pre-gestational diabetes who had developed problems relating to their condition were grouped according to whether they had one or multiple complications.

The authors analysed both the occurrence of high RE in offspring and the specific type of eye problem. Out of 2,470,580 live births included in the study, 56,419 (2.3 per cent) were exposed to maternal diabetes with 0.9 per cent and 0.3 per cent being type 1 and type 2 pre-gestational diabetes respectively (meaning diabetes already present before pregnancy), and 1.1 per cent involving gestational diabetes.

The proportion of births to mothers with diabetes increased over the study period from 0.4 per cent in 1977 to 6.5 per cent in 2016 and diabetes was associated with the mother being older, more educated, having had more pregnancies, and being more likely to live alone.

During the follow-up period, high RE was diagnosed in 533 offspring of mothers with diabetes, and 19,695 offspring of those without the disease. Exposure to maternal diabetes was associated with a 39 per cent greater risk of high RE compared to unexposed offspring.

The researchers observed a difference in RE risk between type 1 and type 2 forms of diabetes with rates of high RE compared to unexposed individuals being 32 per cent and 68 per cent higher respectively. In addition, children of mothers with complications arising from diabetes were twice as likely to have eye problems, compared to an 18 per cent increase in high RE risk in children of mothers who had no complications from the disease.

The authors said: "It was interesting to observe that hypermetropia (long-sightedness) occurred more frequently in childhood and myopia (short-sightedness) was more frequent in adolescence and young adulthood."

They suggest that the difference might be due to the natural process of emmetropisation in which the eye changes shape during early childhood to achieve the normal vision by becoming less long-sighted, and which could correct most hyperopia in early infancy over time. In addition, they point out that the increasing number of years and intensity of school education could increase the risk of myopia from early childhood to young adulthood.

The strengths of this study are that it used high-quality data covering the whole Danish population over a long follow-up period, thus minimising the possibility of selection bias and recall bias. Availability of sociodemographic and medical information enabled the team to adjust for a wide range of factors that could influence the studied medical outcomes, and the large sample size allowed them to investigate details such as the specific types of RE involved.

The authors said: "In this nationwide population-based cohort study, we observed that children born to mothers with either pregestational or gestational diabetes were at an increased risk of developing high RE in general, as well as specific types of high RE, persisting from the neonatal period to early adulthood. Children born to mothers with diabetic complications had the highest risk of high RE."

The researchers suggested: "As many REs in young children are treatable, early identification and intervention can have a lifelong positive impact. Although the 39% increased risk is relatively low effect size, from a public health perspective, considering the high global prevalence of REs, any tiny improvement in this low-risk preventable factor will contribute to a huge reduction in absolute numbers of these eye conditions."

They advise that early screening for eye disorders in the children of mothers with diabetes may play an important role in maintaining good eyesight health.

Mental Health

Study suggests pre-pandemic physiological data can help predict mental well-being during Covid-19 (Hindustan Times: 20210818)

<https://www.hindustantimes.com/lifestyle/relationships/study-suggests-pre-pandemic-physiological-data-can-help-predict-mental-well-being-during-covid19-101629251148796.html>

The study suggests that physiological information collected from individuals long before the onset of Covid-19 can predict mental well-being during the pandemic.

As the impact of the Covid-19 pandemic on psychological well-being unfolds, few studies have focused on pre-pandemic physiological predictors which could identify and treat individuals at risk.

A new Bar-Ilan University study published in the journal Psychophysiology has revealed that physiological information collected from individuals long before the onset of Covid-19 can predict mental well-being during the pandemic.

The study was led by Prof. Ilanit Gordon, of Bar-Ilan's Department of Psychology and Gonda (Goldschmied) Multidisciplinary Brain Research Center, with Prof. Danny Horesh, of the Department of Psychology, and members of Gordon's lab, including Alon Tomashin, Nir Milstein, Oded Mayo, and Adi Korisky.

One hundred eight-five Israeli adults who participated in the study completed online questionnaires assessing their mood regulation since Covid-19 began, and their well-being during the lockdown in mid-2020. The same individuals participated in a lab study 2-3 years prior to the pandemic in which physiological measures were taken during physical activity and during rest.

These measures included respiratory sinus arrhythmia (RSA), which shows how one's heart rate fluctuates according to one's respiration, and skin conductance level (SCL), which measures the activity of sweat glands in the palms.

Both of these measures are controlled by the autonomic nervous system, which regulates involuntary physiological processes including heart rate, arousal, blood pressure, and digestion. The results were assessed to determine individuals' mental well-being and their ability to regulate negative emotions during the pandemic.

Individuals who had higher RSA in the lab (2-3 years ago) reported better expectations to be able to regulate their negative mood during the pandemic, and thus reported higher mental well-being. Individuals with higher SCL did not exhibit the same effect.

Individuals with higher SCL most likely experienced an increased sense of distress or vigilance in these times of uncertainty, and for these reasons, higher RSA (which is an indicator of a more "relaxed" mode of physiological regulation) no longer directly relates to better mental well-being.

"Physiological data assessed during rest, from heart rate, respiration, or sweat activity that was collected in unrelated lab studies 2-3 years ago is predictive of how individuals are coping psychologically today during the Covid-19 pandemic," said Prof. Gordon, who led the study. "This information can help us determine which individuals may be at risk for heightened mental distress and enable us to better locate and treat them."

Prof. Horesh says that these illustrate how physiological information has the potential to deepen our understanding of resilience and risk factors in the face of distress.

Gordon and the team hope to be able to conduct similar studies in other countries, where stress levels differ from Israel.

Heart Disease

People working night shift face increased risk of developing heart problems: Study (Hindustan Times: 20210818)

<https://www.hindustantimes.com/lifestyle/health/people-working-night-shift-face-increased-risk-of-developing-heart-problems-study-101629251174781.html>

The study is the first to investigate the links between night shift work and abnormally fast heart rhythm called atrial fibrillation (AF). Researchers also linked night shift with an increased risk of heart diseases.

People who work night shifts are at increased risk of developing an irregular and often abnormally fast heart rhythm called atrial fibrillation (AF), according to a new study led by a team of international researchers.

The findings were published in the European Heart Journal.

The study is the first to investigate the links between night shift work and AF. Using information from 283,657 people in the UK Biobank database, researchers found that the longer and more frequently people worked night shifts over their lifetimes, the greater their risk of AF. Night shift work was also linked to an increased risk of heart disease, but not to stroke or heart failure.

In addition, the researchers, led by Professor Yingli Lu, of Shanghai Ninth People's Hospital and Shanghai JiaoTong University School of Medicine, Shanghai, China, and Professor Lu Qi, of Tulane University School of Public Health and Tropical Medicine, New Orleans, USA, investigated whether genetic predisposition to AF could play a role in the increased risk.

Patients with long Covid-19 syndrome continue to have higher measures of blood clotting, which may explain their persistent symptoms such as reduced physical fitness and fatigue, according to a study.

Blood clotting may be root cause of long Covid-19 syndrome: Study

They evaluated the overall genetic risk on the basis of 166 genetic variations known to be associated with the condition but found that the genetic risk levels did not affect the link between working night shifts and AF risk, regardless of whether participants had a low, medium, or high genetic risk.

Prof. Lu said: "Although a study like this cannot show a causal link between night shifts and atrial fibrillation and heart disease, our results suggest that current and lifetime night shift work may increase the risk of these conditions.

"Our findings have public health implications for preventing atrial fibrillation. They suggest that reducing both the frequency and the duration of night shift work may be beneficial for the health of the heart and blood vessels."

The study included 286,353 people who were in paid employment or self-employed. A total of 283,657 of these participants did not have AF when they enrolled in UK Biobank, and 276,009 did not have heart failure or stroke.

Information on genetic variants was available for 193,819 participants without AF, and 75,391 of them answered in-depth questions about their lifetime employment in a questionnaire sent out in 2015. Among the participants free of heart disease and stroke when they joined the study, 73,986 provided information on their employment history. During an average follow-up time of over ten years, there were 5,777 AF cases.

The researchers adjusted their analyses for factors that could affect the results, such as age, sex, ethnicity, education, socioeconomic status, smoking, physical exercise, diet, body mass index, blood pressure, sleep duration and chronotype (whether someone was a 'morning' or an 'evening' person).

They found that people who currently worked night shifts on a usual or permanent basis had a 12 per cent increased risk of AF compared to people who only worked during the day. The

risk increased to 18 per cent after ten or more years for those who had a lifetime duration of night shifts. Among people who worked an average of three to eight-night shifts a month for ten years or more, the risk of AF increased to 22 per cent compared to daytime workers.

Among participants currently working night shifts, or working night shifts for ten or more years, or working a lifetime of three to eight night shifts a month, the risk of coronary heart disease increased by 22 per cent, 37 per cent and 35 per cent respectively compared to daytime workers.

Prof. Qi said: "There were two more interesting findings. We found that women were more susceptible to atrial fibrillation than men when working night shifts for more than ten years. Their risk increased significantly by 64% compared to day workers. People reporting an ideal amount of physical activity of 150 minutes a week or more of moderate-intensity, 75 minutes a week or more of vigorous-intensity, or an equivalent combination, had a lower risk of atrial fibrillation than those with non-ideal physical activity when exposed to a lifetime of night shift work. Thus, women and less physically active people may benefit particularly from a reduction in night shift work."

A strength of the study is its size, with detailed information on over 283,000 people. In addition, it is the first study to link these data with genetic information in a population that also has detailed histories available on current shift work and lifetime employment.

Limitations of the study include the fact that it cannot show shift work causes heart problems, only that it is associated with them; some cases of atrial fibrillation may have been missed; lifetime employment was assessed only when people joined UK Biobank, was self-reported, and, therefore, may have changed or been prone to some errors; there may be unknown factors that might affect the results, and the people in UK Biobank were mainly white British and so it may not be possible to generalise the findings to other ethnic groups.

Prof. Lu said: "We plan to analyse the association between night shift work and atrial fibrillation in different groups of people. This may strengthen the reliability of these results and serve as a warning to groups working in certain types of occupations to get their hearts checked early if they feel any pain or discomfort in their chests."

Gene Editing

What if you could become invisible to mosquitoes? (The Indian Express: 20210818)

<https://indianexpress.com/article/technology/science/gene-editing-crispr-cas9-invisible-to-mosquitoes-7458306/>

Scientists used the gene-editing tool Crispr-Cas9 to render humans effectively invisible in the eyes of *Aedes aegypti* mosquitoes, which use dark visual cues to hunt.

If you could have just one superpower, flight or invisibility, which would you choose? And would your answer change if you could become invisible to mosquitoes?

Sure, you might never soar among eagles or brush your cheek against a wisp of cloud. But you would also no longer flee from swarming clouds of mosquitoes, and you would be protected from the deadly diseases that the insects spread.

For the first time, scientists have used the gene-editing tool Crispr-Cas9 to render humans effectively invisible in the eyes of *Aedes aegypti* mosquitoes, which use dark visual cues to hunt, according to a paper recently published in the journal *Current Biology*. By eliminating two of that mosquito's light-sensing receptors, the researchers knocked out its ability to visually target hosts.

"Nobody has studied this before," said Neha Thakre, a postdoctoral researcher at the University of California, San Diego, who studies Crispr as a mosquito control tool. Thakre, who was not involved with the research, said she saw the study as a "great start" to understanding what controls mosquito vision.

Aedes aegypti is a salt-and-pepper scourge on humans across the world. The females, in search of the blood they need to lay their eggs, infect tens of millions of people each year with flaviviruses that lead to dengue, yellow fever and Zika.

"The better we understand how they sense the human, the better we can control the mosquito in an eco-friendly manner," said Yinpeng Zhan, a postdoctoral researcher at the University of California, Santa Barbara, and the lead author on the paper.

Anopheles mosquitoes, which spread malaria, hunt at night, whereas *Aedes aegypti* hunts under the sun, at dawn and dusk. The species depends on a fleet of senses to find blood. A mere whiff of carbon dioxide, a sign that someone or something has just exhaled nearby, sends the mosquito into a frenzied flight.

"They can also detect some of the organic cues from our skin," such as heat, humidity and stench, said Craig Montell, a neurobiologist at the University of California, Santa Barbara,

and an author on the study. But if there is no suitable host, the mosquito will fly straight to the closest-seeming target: a dark spot.

In 1937, scientists observed that *Aedes aegypti* mosquitoes were specifically attracted to people with dark clothing. But the molecular mechanism by which mosquitoes visually sensed their targets was largely unknown.

Many experiments on mosquito vision take place in wind tunnels, large chambers that can cost tens of thousands of dollars. In prior experiments, mosquitoes placed in the wind tunnel and given a whiff of carbon dioxide chose to fly to a dark spot over a white one.

Montell's lab does not have a wind tunnel, so Zhan designed an inexpensive setup — a cage with a black circle and a white circle inside — that cost less than \$100 and delivered the same results as a wind tunnel. In the spring of 2019, Zhan conducted spot tests in the cage. In the fall, Jeff Riffell, a biologist at the University of Washington, along with Claire Rusch, a graduate student, and Diego Alonso San Alberto, a postdoctoral fellow, ran the same experiments using a wind tunnel to double-check the original results.

Knock out a protein

Montell and Zhan suspected that one of the five light-sensing proteins expressed in the mosquito's eye might be the key to eliminating its ability to visually seek out human hosts by sensing dark colors. First, they decided to knock out the rhodopsin protein Op1. Op1, the most widely expressed vision protein in the mosquito's compound eyes, seemed the best candidate for interfering with the mosquito's vision. Zhan injected the mutation into thousands of tiny mosquito eggs using a tool with a special needle with a very tiny tip.

mosquito blind experiment If female mosquitoes were unable to see hosts, they would have a harder time finding the blood required for their eggs to develop. (Zhan et al./Current Biology)

After his wee mutants had grown into adults, Zhan sucked 10 or so females into a tube using a mouth-controlled aspirator. With each group, he held his breath, walked over to the cage and released the females with one big exhale.

The Op1 mutants behaved exactly like the wild-type *Aedes aegypti*: After huffing carbon dioxide, they flew directly to the black dot in the cage. Montell and Zhan tried again, this time knocking out Op2, a closely related rhodopsin. Still, the Op2 mutants showed no meaningful decline in their vision.

But when the researchers knocked out both proteins, the mosquitoes whizzed around aimlessly, showing no preference between the white circle and black circles. They had lost their ability to seek dark-colored hosts.

Were the mosquitoes blind altogether, or just blind to people?

To answer this question, Montell and Zhan ran a series of tests to see how the double mutants responded to light.

First, they tested whether the double mutants would move toward light. Next, they connected electrodes to the double mutants' eyes to measure if the eyes displayed voltage changes in response to light. Finally, they placed the double mutants in rotating cylinders with vertical black and white stripes to see if the insects would walk in the direction of the moving stripes. The double mutants passed all three tests, although they had a weaker response than the wild types in the last two tests.

The mosquitoes were not blind, after all. "My first transgenic mosquito," Zhan said proudly. "We had a happy ending."

The new paper could inform future strategies to control mosquito populations. If female mosquitoes were unable to see hosts, they would have a harder time finding the blood required for their eggs to develop. "The population would crash," Montell said.

Sleep Disorder

Sleep apnea may almost double the risk of sudden death (Medical News Today: 20210818)

<https://www.medicalnewstoday.com/articles/sleep-apnea-may-almost-double-the-risk-of-sudden-death>

Obstructive sleep apnea has become a worldwide health concern.

Sleep apnea has associations with an increased risk of sudden and cardiovascular-related deaths.

Future research should focus on decreasing and preventing this serious sleep condition.

Obstructive sleep apnea has become a globally prevalent health concern. Recent literature estimates that more than 1 billion individualsTrusted Source experience this chronic sleep disorder.

A study by Penn State College of Medicine in Hershey, which appears in BMJ Open Respiratory Research, found that those who receive a diagnosis of obstructive sleep apnea are at a significantly greater risk of dying suddenly than those who do not have the condition.

The word apnea means "without breath." During obstructive sleep apnea, there is a reduction or complete blockage of airflow during sleep. This sleep disturbance manifests itself in

various ways, including excessive daytime sleepiness, fatigue, heavy snoring, and non-refreshing sleep.

Serious consequences of sleep apnea

While these symptoms can potentially affect a person's quality of life, they can also have even more serious consequences.

Researchers at Penn State performed a systematic review of the literature and identified 22 studies focusing on obstructive sleep apnea, cardiac death, and sudden death. The team analyzed the combined data of these studies by meta-analysis.

The quantitative analysis included a combined total of over 42,000 individuals across the world. The mean age of participants was 62 years old, and 64% were men.

The meta-analysis showed that individuals with obstructive sleep apnea were approximately twice as likely to experience sudden death than those who did not have the sleep condition. The study also identified that obstructive sleep apnea resulted in a nearly twofold risk of cardiovascular death that increased with age.

According to Dr. John S. Oh, assistant professor in the Department of Surgery at Penn State Health Milton S. Hershey Medical Center and one of the study authors, many patients do not realize the seriousness of an apnea diagnosis.

"Obstructive sleep apnea is a common condition that can have fatal consequences," stresses Dr. Oh.

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Timely diagnosis and treatment

In an interview with Medical News Today, Dr. Ryan Soose, director of the UPMC Sleep Division, said: "We've known for a long time that untreated sleep apnea patients are more likely to develop high blood pressure, heart disease, and a number of other health conditions. But the risk of sudden death reported in this study is eye-opening and makes a timely diagnosis and treatment even more pressing."

The effects of the nervous system ^{Trusted Source} on the human sleep cycle may explain the association between sleep apnea and the increased rate of sudden death.

Because of the intermittent lack of oxygen that people with sleep apnea experience, the central nervous system may be over-aroused to increase airflow. In turn, this can cause increases in both the systolic and diastolic blood pressure of an individual.

In addition, someone with sleep apnea will experience oxidative stress^{Trusted Source}, which can contribute to an imbalance of antioxidants in the body. This imbalance can damage cells and speed up the aging process, causing numerous health problems over time.

In a podcast, Dale Collier, DO, from Holland Hospital Pulmonary and Sleep Medicine in Michigan, OH, has commented on the serious stressors resulting from obstructive sleep apnea.

“Every time [the throat] closes off, it’s very similar to if someone is being choked,” Collier explains. “This can happen hundreds of times in one night, causing the person stress and fragmentation of their sleep.”

Additional research needed

“Providing accessible and affordable treatments for populations with [obstructive sleep apnea] may ultimately reduce adverse health outcomes for these individuals,” added co-author Emily Heilbrunn.

Dr. Soose agreed: “Rather than the traditional cookie-cutter approach, I believe that cutting-edge sleep apnea management involves customizing a more holistic and combination treatment plan to each individual’s unique needs.”

The Penn State researchers noted some study limitations.

Because the research involved 22 separate studies, factors other than obstructive sleep apnea may have affected the data in each study.

Also, although the meta-analysis included studies from North America, Australia, Europe, Asia, and South America, there were no studies from Africa. The authors note that more research is needed to determine if the results from this study apply to African populations.

In addition, they stress the need for treatments and interventions related to decreasing and eventually preventing obstructive sleep apnea across the globe to optimize survival and increase a person’s quality of life.

Biochemistry

Adult metabolism remains stable until 60, study reveals (Medical News Today: 20210818)

<https://www.medicalnewstoday.com/articles/adult-metabolism-remains-stable-until-60-study-reveals>

Metabolism does slow as we age, but not when most people might have expected. sanjeri/Getty Images

An international study has found that, after accounting for body size, energy expenditure peaks in infancy and then steadily declines until the age of about 20 years.

Contrary to the popular belief that metabolism slows in middle age, the research suggests that energy expenditure does not change until close to the age of 60 years, when it starts to fall again.

However, energy expenditure varies considerably among individuals, even after accounting for body size, sex, and age.

The life phases that the study reveals offer new perspectives on disease, drug activity, and healing, which all link closely to metabolic rate.

A large study that measured the total amount of energy that people expend as they go about their everyday lives has opposed the idea that metabolism slows in middle age.

The study showed that total energy expenditure, adjusted for body size, steadily declines from a peak in infancy until around 20 years of age and then remains stable until about 60. Only then does energy use begin to fall again.

The researchers were surprised to discover that, for their size, 1-year-olds burn calories 50% faster than adults.

“Of course they’re growing, but even once you control for that, their energy expenditures are rocketing up higher than you’d expect for their body size and composition,” says one of the researchers, Dr. Herman Pontzer, associate professor of evolutionary anthropology and global health at Duke University in Durham, NC.

There are several physiological turning points associated with growing older, says Dr. Pontzer, including puberty and menopause.

“What’s weird is that the timing of our ‘metabolic life stages’ doesn’t seem to match those typical milestones,” he says.

Another surprise was how little energy expenditure changes from early adulthood through middle age.

“Perhaps the most unexpected feature was the constancy of metabolic rate in both males and females between the ages of 20 and 60,” tweeted co-author Dr. John Speakman, of the University of Aberdeen in the United Kingdom.

“This suggests that if you are experiencing middle-age spread, it’s more likely to be because you are eating more rather than expending less,” he added.

The research appears in the journal *Science*.

Doubly labeled water

The international team of researchers analyzed data on the total energy expenditure of 6,421 individuals ranging in age from 8 days to 95 years and living in 29 different countries.

In the past, research into energy expenditure has mostly focused on resting or basal metabolism, which is the number of calories burned just to keep the body ticking over.

Basal metabolism includes the energy that the body devotes to vital functions, such as breathing, digesting food, and pumping blood around the body.

However, this only accounts for 50–70% of all the calories that humans burn. For example, it does not include commonplace but energetic activities, such as walking, climbing stairs, jogging, or shopping for groceries.

The researchers behind the new study took a different approach and used the gold standard scientific technique for measuring total energy expenditure, known as “doubly labeled water.”

This method requires study participants to drink water that contains unusual isotopes (heavier versions) of hydrogen and oxygen atoms.

Researchers then analyze daily urine samples from each person to track the rates at which their body excretes each isotope.

The difference between the two elimination rates reveals how much carbon dioxide the person is producing, which, in turn, reflects the rate at which they are burning calories.

Since the 1980s, researchers have used doubly labeled water to monitor how many calories humans burn as they go about their daily activities. However, the high cost of the oxygen isotope has limited the scale of such studies.

The new study overcame this limitation by pooling the results from numerous studies around the world in a single database.

Waxing and waning metabolism

The authors write that the surprisingly high metabolic rate that they found in the tissues of infants might relate to their rapid growth and development.

In contrast, reduced energy expenditure in older people may reflect a decline in metabolism in their organs.

The scientists believe that the metabolic changes that they have identified will lead to further investigations of disease progression, drug activity, and healing, which are all intimately related to metabolic rate.

In addition, they note that their research identified considerable differences in energy expenditure among individuals, even after they accounted for body composition, sex, and age.

One of the limitations of the study was that it provided no information about possible contributory factors, such as diet and physical exercise.

The authors conclude: “Elucidating the processes underlying metabolic changes across the life course and variation among individuals may help reveal the roles of metabolic variation in health and disease.”

In an accompanying comment article, two doctors argue that it may be no coincidence that tissue metabolism — which partly reflects the energy that the body devotes to maintenance and repair — begins to decline just as age-related diseases start to increase in frequency.

Timothy Rhoads and Rozalyn Anderson from the School of Medicine and Public Health at the University of Wisconsin-Madison point out that studies in animals show that metabolic changes are central to the aging process.

They write:

“The decline from age 60 is thought to reflect a change in tissue-specific metabolism, the energy expended on maintenance. It cannot be a coincidence that the increase in incidence of noncommunicable diseases and disorders begins in this same time frame.”

“Cellular activity certainly seems to be declining after [60 years of age], but it’s hard to say precisely which processes are changing,” Dr. Pontzer told Medical News Today.

“I agree that maintenance and repair might be declining, contributing to aging processes, but we’ll need more science to pin that down,” he added.